

Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

High-sensitivity wide-field magnetic field imaging using NV-diamond CONNOR HART, Department of Physics, Harvard University, PATRICK SCHEIDEGGER, Department of Physics, ETH Zurich. Department of Physics, Harvard University, ERIK BAUCH, Department of Physics, Harvard University, JENNIFER SCHLOSS, Department of Physics, Massachusetts Institute of Technology, MATTHEW TURNER, Department of Physics, Harvard University, RONALD WALSWORTH, Harvard-Smithsonian Center for Astrophysics. Department of Physics, Harvard University — We present the first implementation of wide-field magnetic imaging based on the Ramsey protocol and a high density layer of nitrogen-vacancy (NV) color centers at the surface of a diamond chip. Compared to standard CW techniques for optically detected magnetic resonance (ODMR), our pulsed implementation provides enhanced sensitivity, a higher sensing bandwidth (up to ~ 100 kHz), and better noise rejection. By extending the standard Ramsey sensing scheme with advanced quantum control methods, including sensing in the NV center's double-quantum basis $\{-1,+1\}$ and spin bath control, we significantly reduce the imager's susceptibility to inhomogeneities such as crystal-lattice strain fields and microwave gradients over of the field-of-view.

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Date submitted: 06 Feb 2018

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